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| EXAMINER | |
|---|---|
| BARKER, MATTHEW M | |
| ART UNIT | PAPER NUMBER |
| 3662 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/748,822 | NIV, HAIM | |
| | Examiner | Art Unit | |
| | Matthew M. Barker | 3662 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-28 and 31-67* is/are pending in the application.

4a) Of the above claim(s) *4,12,14,15,25,31-33,35,36,45-52 and 55-58* is/are withdrawn from consideration.

5)☒ Claim(s) *41-44 and 62* is/are allowed.

6)☒ Claim(s) *1-3, 5-11, 13, 26-30, 34, 37-40, 53-54, 59-61, 63-67* is/are rejected.

7)☒ Claim(s) *16-24 and 65-67* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1. Replacement drawings were received on 1/10/2007. These drawings are acceptable.

### *Specification*

2. The disclosure is objected to because of the following informalities: Applicant's amendment starting at page 3, line 27 of the specification appears to have mistakenly replaced the original paragraph with the same amended paragraph that starts on page 1, line 22. The original page 3 paragraph should be restored, with the addition of the missing period.

3. Applicant's amendment starting at page 34, line 21 is objected to because there is no page 34 of the specification. The proper location for the amended paragraph is page 23, line 21.

Appropriate correction is required.

### *Claim Objections*

4. Claims 65-67 are objected to because of the following informalities: The claims are drawn to a "method according to claim 53", however claim 53 is drawn to an apparatus. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 60-61, 63-64, and 66-67 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear how the antenna beam can be "non-scanning" yet be steered at the same time, especially in light of claims 59, 62, and 65 which indicate the beam is pointed in a particular direction. Applicant's arguments, see page 16, appear to use the terms "scan" and "steer" interchangeably. Appropriate clarification or correction is required. The claims have been examined as best they can be understood.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 2, 53, 59-61, and 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer et al. (3,218,639).

Regarding claims 1, 2, and 53, DeBell discloses an apparatus (Figure 5) and method of obstacle detection for aircraft including transmitting a radar beam that illuminates terrain and obstacles, receiving the claimed Doppler shifted signal, determining the angle between the line of flight and scatterers, determining the range of the scatterers, and determining one of the azimuth, elevation of the scatterers by direction finding, and calculating the other (see Figure 4 and column 3, lines 34-49).

DeBell does not disclose using a non-scanning radar beam. Mercer discloses a related radar system which uses a non-scanning radar beam to detect aircraft from the ground. Like DeBell, Mercer also detects the angle, range, and elevation of the aircraft. (column 13, lines 21-23; column 14, lines 4-8). It would have been obvious to replace the scanning beam of DeBell with a non-scanning beam as taught by Mercer in order to solve known drawbacks of scanning radar, such as the inability to simultaneously track multiple objects in different directions (Mercer column 1, lines 15-58).

Specifically regarding claim 53, DeBell taken in view of Mercer as discussed above results in the claimed apparatus (DeBell Figure 5), including a transceiver (30), and claimed processor and computer (40).

Regarding claims 59 and 65, the expected orientation of the beam of claims 1 and 53 as discussed above would have been along the direction of flight along or a back to front axis of the aircraft in order to detect objects which present the highest risk to the aircraft, i.e. those objects obstructing the aircraft's path.

Regarding claims 60-61 and 66-67, as best can be understood in light of the 35 U.S.C §112, second paragraph rejection above, the claims recite common beam steering practice, and It would have been obvious to further modify DeBell to steer the beam in the horizontal plane in order to track acquired targets.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 2 above, and further in view of Barton (NPL).

DeBell does not explicitly disclose using the claimed off-axis monopulse azimuth estimation scheme, however such a scheme is taught by Barton in the submitted NPL documents (page 421), and described as "old" (page 529). Therefore, it would have been obvious to use the claimed estimation scheme in the method of DeBell in order to achieve conventional advantages such as reduced error with no new or unexpected results.

9. Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 1 above, and further in view of Katoh et al. (5,339,085).

Regarding claims 5-8, DeBell does not disclose details of a display, however one of ordinary skill in the art would recognize that the data acquired by DeBell could be visually presented to a user. Katoh discloses a three dimensional terrain map in which the backscatter intensity of cells defined by different values of azimuth, elevation, and range is expressed. Katoh also discloses generating and displaying skyline contours based on cells defined by different values of azimuth, elevation, and range, and displaying backscatters that are at a lower elevation and lower range than the skyline (See Figure 6 and column 1, line 39- column 2, line 9). It would have been obvious to modify DeBell to include a display as taught by Katoh in order to provide the operator with a visualization of the surroundings, helping to prevent collision during times of low visibility.

10. Claims 7-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 1 above, and further in view of Foral (3,369,231).

DeBell does not disclose details of a display, however one of ordinary skill in the art would recognize that the data acquired by DeBell could be visually presented to a user.

Regarding claim 7, Foral discloses an airborne obstacle avoidance system, including generating and displaying skyline contours based on cells defined by different values of azimuth, elevation, and range (See Figure 4 and column 1, lines 13-16).

Regarding claim 8, Foral displays backscatters that are at a lower elevation and lower range than the skyline (See Figures 3-4).

Regarding claim 11, Foral discloses the claimed visual warnings (column 1, lines 39-42).

It would have been obvious to modify DeBell to include a display as taught by Foral in order to provide the operator with a visualization of the surroundings, helping to prevent collision during times of low visibility.

11. Claims 9 and 10 rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer and Katoh or Foral as applied to claim 7 above, and further in view of Waruszewski, Jr. (5,086,396).

DeBell as modified does not include the claimed safety circles, however it is well known in the art to include position markings on a aircraft display, as shown by Waruszewki, Jr. (Figure 5 and column 5, lines 28-40). It would have been obvious to

further modify DeBell to include markings as taught by Waruszewki, Jr. or obvious variants such as squares or circles in order to help the pilot prevent collision with terrain.

12. Claims 13, 37, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 1 above, and further in view of Boles (4,546,354).

Regarding claim 13, DeBell does not explicitly disclose the claimed use of Doppler filters, however it is well known in the art to use Doppler filters as claimed to determine the Doppler shift and angle, as shown by Boles (column 5, line 1- column 6, line 4).

Regarding claim 37, Boles discloses the claimed summing of Doppler filter results (column 9, lines 5-9). It would have been obvious to include the analysis as taught by Boles as the method of determining the angle in DeBell in order to achieve conventional advantages with no new or unexpected results.

Regarding claim 38, it would have been obvious to refrain from summing results from sectors closer to the line of flight, as the sectors are already large enough to provide sufficient information to calculate the angle, and further calculation would be wasteful. It is further noted that this practice is disclosed as "well-known" in the present specification (paragraph 0165).

13. Claims 26 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 1 above, and further in view of Lightfoot (4,746,924).

Regarding claim 26, DeBell does not explicitly disclose the claimed separation of ground reflections from object backscatter. However, it is well known to separate target returns from clutter. This is demonstrated by Lightfoot discloses the claimed Doppler filtering (column 12, lines 48). It would have been obvious to separate ground reflections from object backscatter based on the Doppler shift between the backscatter and ground reflections in order to achieve conventional advantages such as a clutter-free signal with no new or unexpected results.

Regarding claim 28, while DeBell nor Lightfoot explicitly disclose pointing a null towards the general direction of the reflection sources, pointing a null to reduce interference is common practice in the art. It would have been obvious to do so in the invention of DeBell as modified in order to achieve conventional advantages with no new or unexpected results.

14. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer and Lightfoot as applied to claim 26 above, and further in view of Jain et al. (5,608,407).

DeBell as modified does not explicitly disclose the claimed separation of ground and object reflections based on Doppler shift, however this is well known practice in the art, exemplified by Jain (column 3, lines 37-42). It would have been obvious separate

ground and object returns in the method of DeBell as modified in order to achieve conventional advantages with no new or unexpected results.

15. Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 2 above.

Claims 29 and 30 are indefinite (see 35 U.S.C. 112, second paragraph rejection above), however as best the claims can be understood, the claims appear to describe well known practice in the art. It would have been obvious to implement them with the method of DeBell in order to achieve conventional advantages such as reducing error and tracking multiple targets with no new or unexpected results.

16. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 1 above, and further in view of Zuta (6,278,409).

DeBell does not explicitly disclose wire detection. Zuta discloses a wire detection method for an aircraft, including estimating the horizontal orientation of the wire as the normal to the azimuth to the reflection point (column 7, line 46- column 8, line 58). It would have been obvious to modify DeBell to include wire detection as taught by Zuta in order to aid a pilot in avoiding wires (DeBell column 1, lines 17-39).

17. Claims 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 1 above, and further in view of Kennedy (4,737,788).

Regarding claim 39, Kennedy discloses the claimed detecting of suspended wires based on normal impingement of a beam, and discriminating wires from other objects (See Figure 1, column 5, lines 18-41).

Regarding claim 40, Kennedy discloses that discriminating wires from other objects is based on a discontinuity of backscatter in the elevation plane when no backscatter comes from elevations below the wire's reflection point, as Kennedy only receives returns in the elevation plane (column 1, lines 5-16).

It would have been obvious to modify DeBell to include wire detection as taught by Kennedy in order to aid a pilot in avoiding wires (Kennedy column 1, lines 23-30).

18. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeBell in view of Mercer as applied to claim 53 above, and further in view of Haupt (4,555,706).

DeBell discloses a monopulse radar system but does not explicitly disclose antenna details, specifically that the antenna has a steerable null common to both sum and difference lobes. Haupt discloses the claimed antenna (column 3, lines 4-31). It would have been obvious to use the antenna of Haupt in the system of DeBell in order to achieve reduced interference and improved performance (See Haupt, column 1, lines 31-45).

***Response to Arguments***

19. Applicant's arguments, see Remarks, pages 15-16, filed 1/10/2007, with respect to the rejection(s) of claim(s) 1, 2, and 53 under 35 U.S.C. §102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new ground(s) of rejection is made in view of Mercer et al. (3,218,639).

***Allowable Subject Matter***

***20.*** Claims 41-44 and 62 are allowed.

Claims 16-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and to overcome the objection(s) set forth in this Office action.

Claims 63 and 64 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

***Conclusion***

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited art relates to non-scanning radar systems.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew M. Barker whose telephone number is (571)272-3103. The examiner can normally be reached on M-F, 8:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on (571)272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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